

WHAT IS CLAIMED IS:

1. A resin recycling system comprising:

crushing means for individually crushing resin  
5 mold products into crushed resinous pieces in which  
70% or more of the crushed resinous pieces have an  
equivalent diameter in a range from 1 to 50 mm;

packing means for packing the crushed resinous  
pieces of the respective mold product into a bag  
10 having a transparent portion;

classification means for irradiating a light beam  
to the crushed resinous pieces in the bag through the  
transparent portion, identifying a kind of the  
crushed resinous pieces based on a reflected beam  
15 therefrom, and classifying the bags into respective  
kinds of resins; and

cleaning means for taking the crushed resinous  
pieces out from the bag and cleaning the crushed  
resinous pieces of the respective kind to remove  
20 foreign matters adhered on the surface thereof.

2. A resin recycling system as defined by claim 1,  
further comprising:

recovery means for separating foreign matters  
25 from a mixture of the crushed resinous pieces and the  
foreign matters, and recovering the crushed resinous  
pieces.

3. A resin recycling system as defined by claim 1,  
wherein said cleaning means comprises a cleaning  
vessel and an agitating member provided in the  
5 cleaning vessel, and an abrasive surface for removing  
the foreign matters on the surface of the crushed  
resinous pieces is provided on at least part of the  
inner wall of the cleaning vessel and/or the surface  
of the agitating member.

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4. A resin recycling system as defined by claim 2,  
wherein said cleaning means comprises a cleaning  
vessel and an agitating member provided in the  
cleaning vessel, and an abrasive surface for removing  
15 the foreign matters on the surface of the crushed  
resinous pieces is provided on at least part of the  
inner wall of the cleaning vessel and/or the surface  
of the agitating member.

20 5. A resin recycling system as defined by claim 1,  
further comprising:  
conveyor means for conveying the bag; and  
wherein said classification means comprises  
identification means, provided in the vicinity of  
25 a predetermined identification position on a  
conveying path of said conveyor means, for  
irradiating a light beam to the crushed resinous

pieces in the bag through the transparent portion of the bag passing by the identification position and identifying the kind of the crushed resinous pieces based on a reflected beam therefrom, and

5 storage means for storing the identified kind of crushed resinous pieces and an expected arrival time at which the bag of the crushed resinous pieces would reach a predetermined classification position on the conveying path, while maintaining the correspondence  
10 between both the stored data,

said classification means being disposed in the vicinity of said predetermined classification position, and operating to classify and collect the respective bag as the crushed resinous pieces in the  
15 bag reaching the classification position is of the kind stored in correspondence to the expected arrival time which is the same as the current time.

6. A crusher comprising:

20 an endless conveyor for conveying polymer mold products, and

an opposed member having an opposed surface confronting at least one end of said endless conveyor on a conveying-directional side and disposed so that  
25 a distance between the opposed surface and a conveying surface of said endless conveyor becomes smaller in a conveying direction, wherein

crushing edges or crushing pins are provided on at least one of the conveying surface of said endless conveyor and the opposed surface of said opposed member, to direct toward the other, whereby

5 the polymer mold products transported by said endless conveyor are pushed into a gap between the conveyor and the opposed member and crushed with said crushing edges or pins.

10 7. A crusher as defined by claim 6, wherein the crushing edges or pins are provided on the conveying surface of said endless conveyer, and

recesses or holes are provided on the opposed surface of said opposed member for allowing tip ends  
15 of the crushed edges or pins provided on said endless conveyor to pass through the same.

8. A crusher as defined by claim 6, wherein said opposed member comprises a second endless conveyor.

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9. An identification device for irradiating a light beam to a polymer product being conveyed by conveyor means, detecting the reflected beam or the dispersed beam from the polymer product by a sensor element,  
25 and identifying a kind of the polymer product based on a detected result, wherein

said sensor element is disposed at a

predetermined position in the vicinity of a conveying path of the polymer product, and

a distance determination mechanism is disposed in said conveying means or in the vicinity thereof, for  
5 opposing the polymer product passing by said sensor element to said sensor element at a predetermined distance between the both.

10. An identification device as defined by claim 9,  
10 wherein said conveyor means comprises an endless conveyor and said sensor element is disposed at a predetermined position beneath the conveying path constituted by said endless conveyor, and

said distance determination mechanism comprises a  
15 light window provided at each of portions of said endless conveyor passing over the predetermined position.

11. An identification device as defined by claim 9,  
20 wherein the conveyor means comprises an endless conveyor and said sensor element is disposed at a predetermined position on a side of the conveying path constituted by said endless conveyor, and

said distance determination mechanism comprises a  
25 stopper member having a light window and disposed in front of said sensor element in the vicinity thereof and a guide for guiding the polymer product carried

on said endless conveyor so that the polymer product is pushed against the light window of the stopper member to be able to pass by a front of said sensor element.

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12. A method for cleaning thermoplastic resinous products, comprising the steps of:

crushing the collected thermoplastic resinous products into crushed pieces,

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supplying the crushed pieces together with water into a cleaning device having a vessel and a rotary body disposed in a rotatable manner within the vessel, wherein at least part of the inner surface of the vessel and/or a surface of the rotary body is

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roughened,

rotating the rotary body and cleaning the crushed pieces.

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13. A method for cleaning thermoplastic resinous products as defined by claim 12,

wherein the roughening is carried out so that the surface irregularity having a depth in a range from 40 to 2000  $\mu\text{m}$  is provided on at least part of the inner surface of the vessel and/or the surface of the rotary body.

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14. A method for cleaning thermoplastic resinous

products as defined by claim 12,

wherein water is continuously supplied from a plurality of portions of the vessel and drained so that a water level in the cleaning device is  
5 maintained constant, while taking care to maintain a ratio in weight of the crushed pieces to the water constant.

15. A method for cleaning thermoplastic resinous  
10 products as defined by claim 12,

wherein the cleaning is carried out under the condition in that the ratio in weight of the crushed pieces to the water in the cleaning device is controlled to be 1 : 0.3 to 2.0; water is  
15 continuously supplied and drained so that the interior temperature of the cleaning device is 70 °C or lower; and a linear speed of a portion of the rotary body farthest from a rotary shaft of the rotary body is in a range from 0.5 to 20 m/sec.

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16. A device for cleaning thermoplastic resinous products comprising a vessel and a rotary body built-in in the vessel,

wherein the vessel has an entrance port for the  
25 thermoplastic resinous products provided in an upper area of one end thereof, an exit port for the thermoplastic resinous products provided in a lower

area of the other end thereof, a water supply port and a drainage port; the drainage port being connected to a drainage line for adjusting a water level; the rotary body having a rotary shaft, a screw  
5 blade provided on the circumference of the rotary shaft and at least one of a plurality of cleaning plates and cleaning pins; and at least part of the inner surface of the vessel and/or surfaces of at least one of the cleaning plates and the cleaning  
10 pins being roughened.

17. A device for cleaning thermoplastic resinous products comprising a vessel and agitating blades, wherein the vessel has an entrance port for crushed  
15 resinous pieces and a water supply port, both provided in an upper portion thereof, and an exit port for the crushed resinous pieces and a drainage port, both provided in a lower portion provided thereof; a drainage line for adjusting a water level  
20 being connected to the drainage port, and at least part of the inner surface of the vessel and/or surfaces of the agitating blades being roughened.